The Economics of Production and Marketing of Greenhouse Crops in Alberta

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By

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Emmanuel Anum Laate

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EXECUTIVE SUMMARY

Alberta's greenhouse crops industry ranks fourth in the country after Ontario, British Columbia and Quebec. The size of Alberta's industry under both glass and plastic is approximately 1.3 million square metres (127.5 hectares or 315 acres). Vegetables make up about 43 percent of the greenhouse area (135 acres) followed by bedding plants, potted flowers and ornamentals at 44 percent (139 acres) and the remaining 13 percent or 41 acres constitute tree seedlings. Out of the 135 acres for vegetables, 76 acres are under cucumbers, 37 acres for tomatoes, 16 acres for peppers and the remaining 6 acres for lettuce and other crops.

In 2012, there were approximately 328 greenhouse operations in Alberta and the industry employed approximately 1,600 full-time and 3,200 part-time workers. A recent survey of the greenhouse industry showed that approximately 99 percent of the greenhouse area in Alberta is under commercial production, with the balance confined to institutions such as universities, research stations and colleges. Most of Alberta's greenhouse operations are highly diversified and are equipped with the most modern equipment to achieve production efficiencies.

Thirty seven (37) greenhouse operators across the province were interviewed to obtain 2011 production costs and returns information on cucumbers, peppers, tomatoes, bedding plants/ornamentals, cut flowers and tree seedlings. The information collected was analyzed after which individual analyses were mailed to study participants for their review and feedback before finalizing the group averages for this report. To preserve confidentiality, group averages were developed for greenhouse crops with three or more participants.

The results show that the most significant costs items for the 2011 crop were labour (hired and operator), material inputs (growing media, seed/cuttings, fertilizer and chemicals, trays, boxes and other packaging materials), marketing and natural gas. The total cost of production ranged from $94.54 per square metre for tomatoes to $125.83 per square metre for bedding plants/ornamentals. Average investment cost per square metre ranged from $118.37 for cucumbers to $300.51 for bedding plants/ornamentals greenhouses in Alberta.

The gross margins estimated were positive for all crops. Average returns to unpaid labour, investment and equity were positive for all crops except peppers. The results show that bedding plants/ornamentals had the highest gross return per square metre. This was followed by cut flowers, tomatoes, cucumbers, pepper and tree seedlings. Based on the results of the 2011 study, the gross revenue generated by the provincial greenhouse industry in 2012 was estimated to be approximately $162 million, with an investment or total value of assets of about $261 million.

This report provides the most current information on costs and returns for major greenhouse crops in Alberta. Although the sample size was small, the data and results presented in the report provide enough information to serve as a guide to producers and others.

SECTION I

INTRODUCTION

The origin of the Alberta Greenhouse Crops Industry goes back over a hundred years. It was in 1905 when Dutch and German settlers began plant production under protection cultivation. Since 1970, Alberta Agriculture and Rural Development (ARD) have committed material resources to the development and growth of this industry in Alberta.

Alberta's greenhouse industry is ranked fourth in the country. Preliminary estimates of total greenhouse area by Statistic Canada in 2012 shows that Ontario continues to lead the greenhouse industry with 13 million square metres (1,330 hectares), followed by British Columbia at 5.3 million square metres (531 hectares) and Quebec at 2.6 million square metres (262 hectares). In percentage terms, Ontario accounts for 56 percent of all greenhouse area in Canada, with British Columbia at 23 percent and Quebec at 11 percent. Alberta accounts for about five (5) percent of the greenhouse area in Canada and the other provinces combined accounted for the remaining five (5) percent of greenhouse area.

Presently, the size of Alberta's greenhouse industry, under both glass and plastic, is approximately 1.3 million square metres (127.5 hectares or 315 acres). Vegetables make up about 135 acres of the total acreage; bedding plants and ornamentals, 139 acres and tree seedlings constitute approximately 41 acres. Out of the 135 acres for vegetables, 76 acres are under cucumbers, 37 acres for tomatoes, 16 acres for peppers and the remaining 6 acres for lettuce and other crops.

In 2012, there are 328 greenhouse operations in Alberta and the industry employed approximately 1,600 full-time and 3,200 part-time workers. A recent survey of the industry across the province showed that approximately 99 percent of the greenhouse area in Alberta is under commercial production, with the balance confined to institutions such as universities, research stations and colleges. Most of Alberta's greenhouse operations are highly diversified and are equipped with the most modern equipment to achieve production efficiencies.

Major greenhouse crops grown include vegetables, bedding plants, potted flowers and ornamentals, cut flowers, herbs, perennials and tree seedlings. Tree seedlings are produced under contract for the forestry industry.

During the last decade, the greenhouse industry in Alberta grew rapidly. This growth was prompted by consumer demand for fresh and quality produce. Lower taxes and input costs also contributed to this growth however, recent rapid increases of natural gas and electricity prices have somewhat dampened further expansion prospects for this industry in the short run.

Due to the several adjustments the greenhouse industry in Alberta has gone through, the need to estimate costs and returns data based on current conditions is important to contribute to informed decision making. This report is based on actual costs and returns from thirty six

(36) greenhouse operators across the province[1], and provides more current data on costs and returns for major greenhouse crops.

Objectives of the Study

The major objectives of the study are as follows:

1. To describe the structure of the greenhouse industry in Alberta.
2. To report estimated greenhouse production costs and returns by major crops.
3. To identify the main factors influencing production and marketing of greenhouse crops in Alberta.
4. To identify major problems experienced by greenhouse producers in Alberta.

The Study Sample

A questionnaire specifically designed for greenhouse operations was used to obtain the required information from a selected sample of greenhouse operators across Alberta. Thirty seven (37) greenhouse operators were interviewed to obtain production costs and returns information on bedding plants/ornamentals, cut flowers, tree seedlings, cucumbers, peppers, and tomatoes for the 2011 crop.

Method of Analysis

The raw data obtained was reviewed for information gaps before entering into the computer for analysis. Individual analyses and group averages were developed using the Paradox program. Individual analyses were mailed to study participants for their review and feedback before finalizing the group averages for this report.

To preserve confidentiality, group averages were developed for greenhouse crops with three or more participants. For crops with less than three participants reporting (i.e. cut flowers and tree seedlings), some of the data collected for the 2008 crop year were updated to 2011 using farm input price indices (FIPIs) and prices received for various crops and then blended with the 2011 information collected to develop group averages.

Readers are advised to note that due to the small sample size, only aggregate production costs and returns information for the whole province has been presented in this report. The costs and returns information were not broken down into the Medicine Hat/Redcliff and North-Central groups as reported in previous versions of the report.

[1] In total, thirty seven (37) greenhouse operators were surveyed.

SECTION II

OVERVIEW OF THE GREENHOUSE INDUSTRY IN ALBERTA

Although greenhouses in Alberta are scattered throughout the province, almost two-thirds of these operations are located in the south and south-central regions. The area around Medicine Hat/Redcliff is called the "greenhouse capital of the Prairies". This area is well known for the Red Hat Co-op (a producer organization responsible for marketing of greenhouse vegetables). Figure 1 shows the distribution of greenhouses by survey regions in Alberta.

Figure 1: Distribution of Greenhouses by Survey Regions in Alberta, 2010

Source: A Profile of the Greenhouse Industry in Alberta in 2010

Most greenhouse operations are located in cities and towns because of easy access to labour, marketing facilities, utilities and the services necessary for a greenhouse operation. Due to very high land prices and taxes, during the last several years few new greenhouses have been built at a distance from major population centers.

Greenhouse Area in Alberta and Canada

Data in Tables 1 and 2 provide historical overview of the growth of the greenhouse industry in Alberta and Canada from 1981 to 2012. During the last thirty one years, i.e. 1981 to 2012 greenhouse area in Alberta has increased by almost 227 percent. On average, this translates to an annual percentage increase of about seven (7) percent.

Table 1: Greenhouse Area in Alberta and Canada, 1981-2012 (Hectares)

	1981	1986	1991	1996	2001	2003	2005	2010	2011	2012
Alberta	39	52	53	74	104	115	117	121	126	127.5
Canada	665	719	844	1,274	1,781	1,879	1,989	2,253	2,296	2,306
Percent Alberta	5.9	7.2	6.3	5.8	5.8	6.1	5.9	5.4	5.5	5.5

Source: Statistics Canada; Alberta Greenhouse Growers Association.

Table 2: Greenhouse Area in Alberta and Canada, 1981-2012 (Million Square metres)

	1981	1986	1991	1996	2001	2003	2005	2010	2011	2012
Alberta	0.390	0.520	0.530	0.740	1.040	1.150	1.170	1.213	1.254	1.275
Canada	6.65	7.19	8.44	12.75	17.80	18.78	19.88	22.53	22.96	23.05
Percent Alberta	5.9	7.2	6.3	5.8	5.9	6.1	5.9	5.4	5.5	5.5

Source: Statistics Canada; Alberta Greenhouse Growers Association.

As shown in Tables 1 and 2, the fastest growth in greenhouse area in Alberta and Canada occurred between 1996 and 2001. Since 2001, greenhouse area in Alberta has increased by about 23 percent (from 104 hectares in 2001 to 127.5 hectares in 2012).

Greenhouse Operations in Alberta

According to a comprehensive survey[2] of the provincial greenhouse industry completed in 2010, Alberta had approximately 328 commercial greenhouse operations. These operations employed approximately 1,550 full-time and 3,100 part-time workers. This survey, undertaken by Alberta Agriculture and Rural Development in cooperation with Alberta Greenhouse Growers Association (AGGA) provided detailed information on the size and structure of the greenhouse industry in the province.

[2] Abdusalam Asif Maan, "Profile of the Greenhouse Industry in Alberta 2010", Alberta Agriculture and Rural Development, Edmonton, Alberta.

Table 3 shows the number of greenhouse operations by size and by region. The province was divided into these areas to obtain a better understanding of the location and size of greenhouse operations.

Table 3: Number of Greenhouse Operations by Size and by Regions in Alberta, 2010

Survey Region	Industry Area (m^2)	Size of Operation (Sq. M.)				Number of Greenhouses by Region
		< 1,000	1,000 to 2,000	2,001 to 4,000	>4,000	
Fort McMurray	2,788	0	0	2	0	2
Grande Prairie	87,361	11	6	0	11	28
Whitecourt	25,619	4	11	11	2	28
Edmonton	124,535	17	17	4	9	47
Bonnyville	88,290	6	6	4	4	21
Lloydminster	26,022	9	4	6	0	19
Red Deer	189,550	19	13	9	24	64
Calgary	144,052	9	6	9	6	30
Medicine Hat	492,565	2	0	15	58	75
Lethbridge	32,528	2	2	4	4	13
Total Operations	**1,213,311**	**79**	**66**	**64**	**118**	**328**
Percent of Operations	-	**24**	**20**	**20**	**36**	**100**

Source: A Profile of the Greenhouse Industry in Alberta in 2010

As shown in Table 3, the three regions with the largest greenhouse area in the province are Medicine Hat (41 percent), Red Deer (16 percent), and Edmonton (10 percent). The remaining 33 percent of greenhouse area is scattered throughout the province, from Peace River in the north to Lethbridge in the south.

Approximately 24 percent (79) of greenhouse operations are less than 1,000 square metres (m^2). Twenty percent each of the operations are between 1,000 to 2,000 and 2,000 to 4,000 square metres respectively. About 36 percent (118) of greenhouse operations are in the over 4,000 square metres group.

It is important to note that Statistics Canada conducts a survey of the greenhouse industry every year to identify the number of commercial operations in the province, crops grown and the total output of crops produced in a controlled environment. The data is published in the "Greenhouse, Sod and Nursery Industries" report. In 2012, Statistics Canada Survey reported 310 greenhouse farms in Alberta.

Greenhouse Crops in Alberta

Major greenhouse crops grown include vegetables, bedding plants, potted flowers and ornamentals, cut flowers, herbs, perennials and tree seedlings. Table 4 shows the types of crops grown in greenhouses across the province.

The most commonly grown greenhouse vegetables are cucumbers, tomatoes, peppers and lettuce. During the last few years attempts have been made to grow eggplants, cauliflower, cabbage, herbs and Chinese vegetables, as well as other crops.

Greenhouses in Alberta produce many kinds of flowers; chrysanthemums, roses and geraniums being the most common potted plants. Outdoor flowers such as petunias and marigolds are also produced in these greenhouses. Some greenhouse operations concentrate on importing tropical plants, which are acclimatized to Alberta conditions before resale.

Table 4: Greenhouse Crops Grown in Alberta, 2010

Greenhouse Crops	No. of Growers	Area (m^2)	% of Area by Crops
Vegetables			
Cucumbers	114	327,897	27
Tomatoes	117	196,859	16
Peppers	90	81,320	7
Lettuce	28	6,842	1
Egg Plant	6	409	0
Other Crops	6	6,832	1
Sub-Total	**361**	**620,159**	**51**
Floriculture			
Bedding Plants	212	223,809	18
Potted Flowers & Ornamentals	42	56,479	5
Cut Flowers	21	41,250	3
Herbs	31	14,520	1
Perennials	136	92,035	8
Sub-Total	**442***	**428,093**	**35**
Tree Seedlings	**26**	**165,058**	**14**
TOTAL	**829***	**1,213,311**	**100**
*Growers producing multiple crops. Actual number of growers surveyed for crops grown was 328.			

Source: A Profile of the Greenhouse Industry in Alberta in 2010

A considerable number of greenhouses produce more than one crop. The only greenhouses growing a single crop are those producing vegetables and a few of these also grow bedding plants. Greenhouses producing a variety of crops are in operation year round, whereas the vegetable greenhouses are in operation for about ten months, February through November. Those producing bedding plants are in operation for about five months, February to June.

Greenhouse Crops Area by Regions

Table 5 provides information on greenhouse crop size by regions in Alberta. The largest greenhouse area, with 620,159 square metres (51 percent) was reported under vegetables, followed by 428,093 square metres (35 percent) under floriculture and 165,058 square metres (14 percent) under tree seedlings.

The Medicine Hat region which includes Redcliff reported 69 percent of the greenhouse area under vegetables. Three largest floriculture production centers are Red Deer, Edmonton, and Calgary. Bonnyville and Grande Prairie are the leading tree seedling production regions followed by Medicine Hat/Redcliff area at (24 percent).

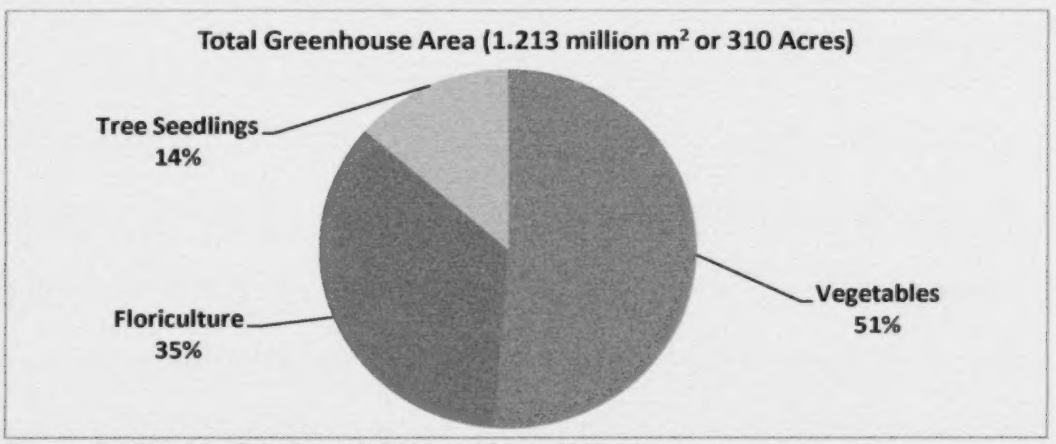
Table 5: Vegetables, Floriculture and Tree Seedlings Production Area by Regions, 2010

Region	Greenhouse Area By Crops (Sq. M.)			
	Vegetable Area (m^2)	Floriculture Area (m^2)	Tree Seedlings Area (m^2)	Total Area by Region
Fort McMurray	1,366	1,422	0	2,788
Grande Prairie	238	30,596	56,527	87,361
Whitecourt	4,494	29,521	592	25,619
Edmonton	46,374	78,161	0	124,535
Bonnyville	14,499	12,767	61,024	88,290
Lloydminster	8 407	17,615	0	26,022
Red Deer	27,936	156,874	4,740	189,550
Calgary	80,582	60,745	2,725	144,052
Medicine Hat	425,734	27,381	39,450	492,565
Lethbridge	19,517	13,011	0	32,528
Total Area	**620,159**	**428,093**	**165,058**	**1,213,311**
Percent of Total	**51**	**35**	**14**	**100**
Note: Conversion rate: One Square metre = 10.7639 sq. ft.			**N=328**	

Source: Profile of the Greenhouse Industry in Alberta, 2010

Figure 2 is based on the data presented in Table 5. Vegetables had the record size, 51 percent in the province in 2010, followed by 35 percent for floriculture and 14 percent for tree seedlings.

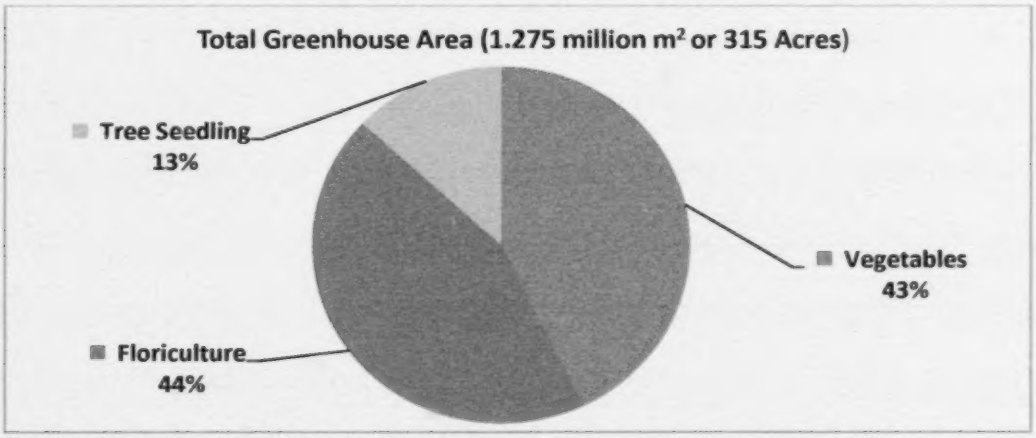
Figure 2: Greenhouse Vegetables, Floriculture and Tree Seedlings in Alberta, 2010



Source: Profile of the Greenhouse Industry in Alberta, 2010

Figure 3 shows the breakdown by size for the different greenhouse crops in 2012. Bedding plants, potted flowers and ornamentals account for about 44 percent of the total greenhouse area in Alberta. This is followed by vegetables at 43 percent and the remaining 13 percent comprise of tree seedlings.

Figure 3: Greenhouse Vegetables, Floriculture and Tree Seedlings in Alberta, 2012



Source: Alberta Greenhouse Growers Association

Marketing of Greenhouse Crops

As shown in the 2010 profile report, greenhouse operators use several channels to market their produce. The most important of these are retail facilities owned by greenhouse operators, either attached to the greenhouses or located in an urban area; other retail and wholesale facilities; the Co-op at Redcliff; Pick-N-Pack Co-op at Lacombe and farmers' markets in various centers.

The Red Hat Co-op at Redcliff serves as the focal point for the marketing of long English cucumbers, tomatoes and peppers grown in and around Medicine Hat/Redcliff. Cucumber producers in north-central Alberta market their produce through Pick-N-Pack (a cooperative of growers in Lacombe). Greenhouse operators pay a commission or fee set by the Board of Directors of the Co-ops to cover grading, packaging, storage, marketing and administration costs.

In north-central Alberta, greenhouses producing vegetables and bedding plants sell a large percentage of their produce at the gate and through rented stalls/booths in shopping centers and farmers' markets. Farmers' markets have become popular marketing outlets, especially during the bedding plant season.

Physical Characteristics of Greenhouses

Greenhouses in Alberta range from small sash roof "lean-to" houses constructed of a wood-frame sash, to large modern steel frame houses with truss supported roofs. Most new greenhouses are made of steel, wood or masonry covered with either glass, fiberglass, double plastic or a single layer of plastic. New greenhouse operations are equipped with most modern and efficient crop production tools. The major internal features of greenhouse systems in Alberta are as follows:

a. Heating and Environmental Control Systems:

A year round greenhouse operation is heated, using natural gas, steam, propane or coal to maintain optimum temperatures for crops grown during the winter months. Some vegetable

producing greenhouses operate ten months of the year and close down during December and January. Greenhouses producing cut flowers operate year around and thus have high heating requirements. Natural gas burners heat almost all of the greenhouses in southern Alberta and when combined with stovepipes these burners provide sufficient heating through natural air movement. Greenhouses in northern Alberta are equipped with natural gas boilers and hot water pipes for heating. All boiler-heating systems have automatic temperature control devices.

In addition to heating systems, most greenhouses in Alberta are equipped with a pad and fan cooling system. The cooling system is essential if temperatures are to be lowered during the hot summer months. Table 6 presents the various types of heating systems used in greenhouse operations in the province. In some cases a grower has more than one heating system. During the last four to six years, almost a dozen greenhouse operations have either completely switched over to using coal or added coal fired furnaces to reduce natural gas costs.

Table 6: Type of Heating Systems Used in Greenhouses, 2010

Systems	Responses	Percent of Responses
Natural Gas Furnace	300	79
Hot Water	131	30
Steam	17	4
In-floor heating	19	4
Propane Furnace	17	4
Soil Heating	19	4
Electric	9	2
Stove Pipe Heater	17	4
Coal Deckker	47	12
Bio-therm	2	1

Source: Profile of the Greenhouse Industry in Alberta, 2010 **N = 328**

b. Watering Systems:

The watering of ground beds is usually done by the use of soaker hoses, which run parallel to each side of the bed. Bench beds and potted plants are usually watered with the use of chapin tubes. Other operations may use water supply pipes along with garden hoses.

c. Supplementary Lighting:

Very few greenhouses have supplementary lighting. Those that do, make use of ordinary lamps, or High Pressure Sodium (HPS) lights in winter to increase flower production and thus adjust the supply and demand balance usually five to six feet apart. Supplementary lighting is mostly used for producing chrysanthemums and roses.

Type of Fuel Used in Greenhouse Operations

As illustrated in Table 7, natural gas continues to be the fuel of choice for heating greenhouses in Alberta. In 2010, about 79 percent of growers in Alberta used natural gas.

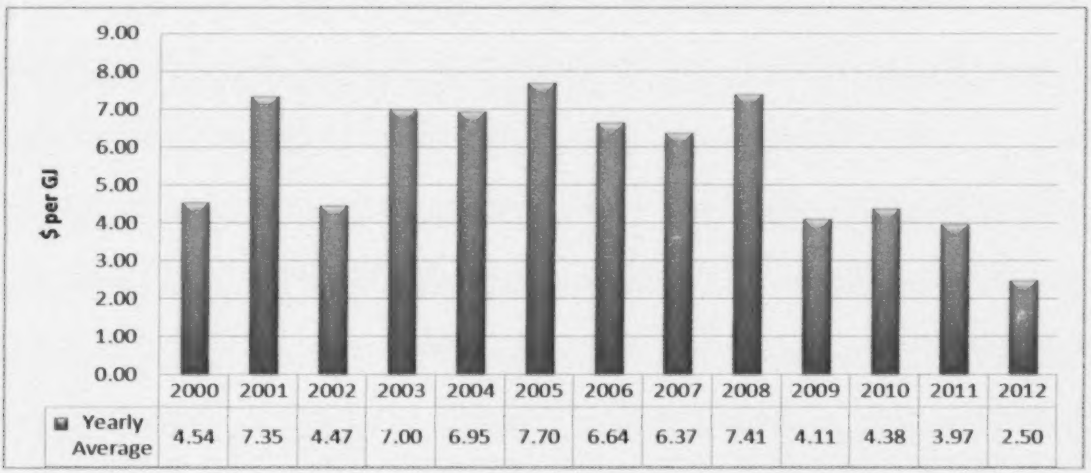
Table 7: Type of Fuel used in Greenhouse Operations in Alberta, 2010

Region	Fuel Type					Total by Region
	Natural Gas	Coal	Wood	Oil/Propane	Electric	
Fort McMurray	0	2	0	2	0	4
Grande Prairie	26	2	4	4	4	41
Whitecourt	28	4	2	0	0	34
Edmonton	39	11	0	2	0	51
Bonnyville	17	0	2	4	2	26
Lloydminster	19	0	0	0	0	19
Red Deer	56	13	0	2	2	73
Calgary	30	4	0	2	0	36
Medicine Hat	73	9	0	0	0	81
Lethbridge	13	2	0	0	0	15
TOTAL	300	47	9	17	9	382
Percent of Growers	**79**	**12**	**2**	**4**	**2**	**100**

Source: Profile of the Greenhouse Industry in Alberta, 2010 **N = 328**

Figure 4 shows yearly average data and graph for natural gas prices obtained under the Alberta Input Monitoring Systems (AIMS). These prices do not include service and delivery charges for natural gas.

Figure 4: Alberta Natural Gas Prices, 2000-2012



Source: Alberta Farm Input Prices, Statistics and Data Development Branch, Agriculture and Rural Development, Edmonton, Alberta.

In 2001 natural gas prices increased by about 62 percent compared to a year earlier. The price decreased significantly in 2002 but climbed to $7.00 per GJ, an increase of over 56 percent in 2003. In 2004, natural gas price showed a marginal decrease but increased to a record level in 2005, thus putting a serious economic constraint on businesses relying heavily on natural gas. In 2006 and 2007, natural gas price decreased by 19 and 23 percent

respectively compared to 2005. Volatility in natural gas prices continued into 2008 leading to an increase of about 16 percent compared to 2007.

Since 2008 natural gas prices have continued to decrease dramatically. This is due to an abundant supply and storage of natural gas in Canada and the U.S. Natural gas industry analysts predict there is a good possibility that industry will not face the natural gas price crunch it experienced from 2003 to 2008 for the next several years.

Import/Export Performance

Alberta is a net importer of greenhouse produce, with the bulk of imports occurring during the winter months. Preliminary data from Statistics Canada shows that in 2012, Alberta held approximately 1.2 percent of the Canadian import share for selected fresh or chilled greenhouse vegetables (tomato, peppers, cucumbers and lettuce), importing $0.3 million of the nation's total of approximately 17 million. Imports of other selected greenhouse and nursery products amounted to $6.8 million in 2012 and represents approximately 1.9 percent of the nation's total of $361 million. Products imported include cut flowers and buds, live plants, cuttings and slips, bulbs, tubers, corms, crowns and rhizomes, roses, etc.

SECTION III

COSTS AND RETURNS OF GREENHOUSE CROPS - KEY TERMINOLOGIES

The terminologies used in this report are defined as follows.

Interest on Investment:
Interest is defined as a sum paid or calculated for the use of capital. The sum is usually expressed in terms of a rate or percentage of the capital involved, called the interest rate. Interest is charged for the use of investment capital. Had the capital not been invested to buy a specific asset, it could have been used elsewhere, either within or outside the firm and would have brought some additional return to the firm. However, for the purposes of this study, actual paid capital interest was used to arrive at capital costs.

Depreciation:
Depreciation is defined as the loss in value of an asset over time, mainly as a result of obsolescence. For buildings and equipment it is that portion of the decrease in value resulting from the passage of time. Obviously, part of the reduced value of the buildings and equipment is the result of usage and is considered a variable cost. The entire depreciation is considered a fixed cost.

Each operator was asked to value the greenhouse structure based on the current market costs of replacement. To calculate depreciation on buildings, machinery and equipment, participants were asked to provide an estimate on life of the structure and equipment. In computing depreciation, a 10 percent allowance or salvage value is taken from the purchase price of the buildings and equipment. The following formula was used in arriving at depreciation for buildings and equipment.

Property and Business Taxes:
Taxes on real estate include payments made on the assessed value of the greenhouse operation less any assessment for the greenhouse operator's residence or operations other than the greenhouse. There is a business tax on greenhouses located in urban municipalities. Exact amounts of property and business taxes were included in the costs.

Labour Costs:
Hired labour costs included the amount of wages and any benefits received by the hired workers, such as contributions to Workers' Compensation, Canada Pension Plan, and Unemployment Insurance. The hours spent by the operator and his/her families in greenhouse production were estimated. An operator's labour was valued at $10.50 per hour and family labour was valued at either the rate paid to hired labour or the actual amount paid to family members.

Production Materials and Supplies:
Production materials and supplies included the purchase of cuttings, seed plants, fertilizers, chemicals, soils, vermiculite, perlite, peat moss, straw, peat pots and plastic. Costs of production materials and supplies were the actual figures provided by the study participants.

Heating Costs:
Almost all greenhouse operators had reasonably accurate costs for heating the greenhouses with natural gas. Monthly bills were helpful in arriving at the total heating costs. A sudden increase in natural gas costs during the fall of 2000 and continuing into the following years prompted major concerns for economic viability of the greenhouse industry at that time. Natural gas price peaked to $9.85 per GJ in July 2008. Starting in August 2008, natural gas price has been on the decline. In 2011, it ranged from $3.61 per GJ in December to $4.34 per GJ in February.

Utility Costs:
Utility costs included electricity, telephone and water. Where the utility bill was combined with the greenhouse operator's residence, the operator was asked to apportion the bill to arrive at total utility costs for the greenhouse operation.

Transportation Expenses:
Expenses for trucks or other vehicles owned by greenhouse operators were apportioned according to their use in the greenhouse operation, personal and leisure driving. Freight charges paid to commercial or private carriers for hauling greenhouse produce or supplies were included in the transportation expenses.

Repairs and Maintenance Costs:
Maintenance costs included repairs to greenhouse structures, boilers, heating equipment, tractors and all other machinery and equipment associated with the greenhouse operation.

Marketing Charges:
Marketing charges were the actual amount paid by each greenhouse operator for having produce marketed through the Redcliff and Edmonton Co-ops. These charges covered

grading, packaging, marketing and administrative fees. The charges paid by each grower were included as a cost item in the study.

Miscellaneous Costs:
These costs include legal and accounting fees, office supplies, membership fees, insurance costs and other costs incurred in a greenhouse operation, but not reported under any other heading.

Management Indicators:
Management indicators presented at the bottom of various tables show gross margin, return to unpaid labour, investment and equity. These indicators provide profit margins and economic viability of the various enterprises.

- Gross margin - gross revenue less cash costs. A positive gross margin shows that enterprise is economically feasible.
- Return to unpaid labour - gross revenue less total production costs plus unpaid labour.
- Return to investment - gross revenue less total production costs plus capital interest.
- Return to equity - gross revenue less total production costs

SECTION IV

GREENHOUSE PRODUCTION COSTS AND RETURNS FOR CUCUMBERS

In 2011, cucumber production represented about 23 percent of the greenhouse area in Alberta (71 acres). Long English cucumbers are the second largest crop produced in a controlled environment closely followed by bedding plants. Almost 80 percent of greenhouse cucumber production is in the "Greenhouse Capital of the Prairies" - the Medicine Hat/Redcliff area.

Production costs and returns as well as investment data presented in Tables 8 and 9 are based on data obtained from eight out of the nine greenhouse cucumber producers surveyed across the province. Production costs include operating costs, investment costs, depreciation (buildings, equipment and automotive) and operator's labour. For any enterprise or operation to be economically viable, it must recover operating costs.

Gross Return:
Gross return (A) represents sales of cucumbers through the co-ops and other market outlets. Cucumber sales for an average greenhouse with production area of 11,374 square metres (122,429 square feet) were estimated at $1,218,849 or $107.16 per square metre (Table 8). When crop insurance and other miscellaneous receipts were included to value of cucumber sales, total gross revenue increased to $1,219,411 or $107.21 per square metre.

Variable Costs:
Variable costs (B) include all out-of-pocket costs and unpaid labour, which amounted to $1,051,203 per greenhouse with average production area of 11,374 square metres. In terms of variable costs per square metre, this was estimated at $92.14. Due to the producers' interest in knowing their variable costs for each basic unit of production, these costs were broken into as much detail as possible. The most significant cost items were labour, marketing costs, electricity costs, followed by growing media/seed, natural gas, fertilizer and chemical costs.

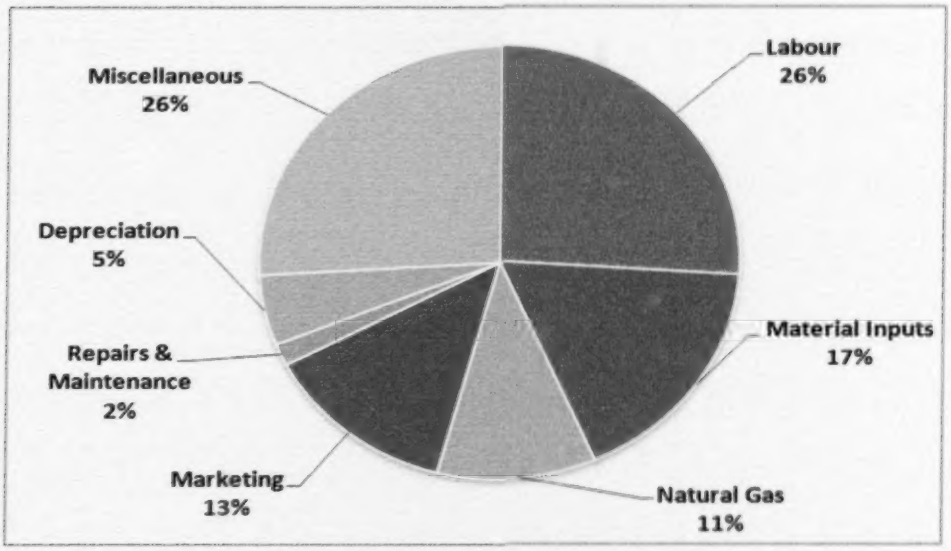
Capital Costs:
Capital costs (C) were comprised of property/business taxes, equipment and building depreciation, lease payments and actual capital interest paid. On average, the total capital cost per greenhouse amounted to $102,628 or $9.03 per square metre in 2011.

Cash Costs:
Cash costs (D) include all out-of-pocket costs except unpaid labour and equipment and building depreciation. These costs amounted to $1,093,035 per average greenhouse (11,374 square metres) or $96.09 per square metre.

Total Production Costs:
Average total production costs for cucumber producing greenhouses were estimated at $1,153,831. These costs were $101.44 per square metre. Details on the total production costs for greenhouse cucumber production are presented in Table 8.

Figure 5 shows the relative proportion of all costs for greenhouse cucumber production for the 2011 crop year. Expenses associated with material inputs include growing media, seed/cuttings, fertilizer and chemicals, trays, boxes and other packaging materials.

Figure 5: Breakdown of Greenhouse Cucumber Production Costs, 2011



Management Indicators:

Average gross margin (A-D) was positive at $126,376 or $11.12 per square metre. A positive gross margin indicates that the enterprise is economically feasible. Average return to unpaid labour was positive and amounted to $65,905 per greenhouse producing cucumbers or $5.80 per square metre. Average return to investment was positive at $98,580 per greenhouse ($8.67 per square metre). Average return to equity was also positive at $65,580 per greenhouse or $5.77 per square metre.

Investment Costs:

The average greenhouse area for the eight (8) cucumber producing greenhouses was 11,572 square metres (124,560 square feet). On average, land associated with these greenhouses was estimated to be just over four acres valued at $22,309 or $1.93 per square metre of greenhouse area. The average investment in greenhouse buildings for cucumber producing greenhouses amounted to $856,625 per greenhouse ($74.03 per square metre). Average investment in machinery and equipment was reported at $490,735 per greenhouse ($42.41 per square metre). When land, buildings, machinery and equipment investments were combined, total investment was estimated at $1,369,669 per greenhouse. In terms of dollars per square metre it was $118.37. Details on land, building, machinery and equipment investment and depreciation are given in Table 9.

Table 8: Production Costs and Returns for Cucumber Producing Greenhouses in Alberta, 2011

Production Area: 11,374.00 sq. m.

Number of producers: 8

				Total $	$/sq. m.
(A)					
	1. Crop Sales - Imputed Value of Production			1,218,848.50	107.16
	2. Crop Insurance Receipts			562.50	0.05
	3. Miscellaneous Receipts			0.00	0.00
	GROSS RETURN			**1,219,411.00**	**107.21**
(B)					
	1. Growing Media, Seed/Cuttings			131,303.25	11.54
	2. Fertilizer and Chemicals			60,927.88	5.36
	3. Greenhouse Insurance			18,599.75	1.64
	4. Trays, Boxes and Other Packaging			8,310.63	0.73
	5. Freight and/or Trucking Costs			7,437.88	0.65
	6. Auto Fuel, Repairs, Licenses and Auto Ins.			20,799.50	1.83
	7. Repairs - Buildings and Equipment			19,026.25	1.67
	8. Utilities: Natural Gas	0.00 GJ		123,307.25	10.84
	9. Electricity	0.00 KW		135,993.50	11.96
	10. Water	0.00 M^3		10,460.75	0.92
	11. Phone			3,602.13	0.32
	12. Custom Work and Specialized Labour			4,440.00	0.39
	13. Marketing Costs			151,517.88	13.32
	14. Assoc. Dues, Prof'l Fees and Promotion			4,776.81	0.42
	15. Small Tools, Supplies and Misc. Expenses			21,076.50	1.85
	16. Operating Interest Paid			1,751.19	0.15
	17. Labour Insurance/Benefits			28,035.63	2.46
	18. Hired Labour	22,277.50 hours		299,511.00	26.33
	19. Unpaid Labour	40.63 hours		325.00	0.03
	VARIABLE COSTS			**1,051,202.78**	**92.41**
(C)					
	1. Property/Business taxes			9,157.00	0.81
	2. Equipment and Building	a) Depreciation		60,470.81	5.32
		b) Lease Payments		0.00	0.00
	3. Paid Capital Interest			33,000.63	2.90
	TOTAL CAPITAL COSTS			**102,628.44**	**9.03**
(D)	**CASH COSTS**	**(B+C-B19-C2a)**		**1,093,035.41**	**96.09**
(E)	**TOTAL PRODUCTION COSTS**	**(B+C)**		**1,153,831.22**	**101.44**
(F)	**GROSS MARGIN**	**(A-D)**		**126,375.59**	**11.12**
	RETURN TO UNPAID LABOUR	**(A-E+B19)**		**65,904.78**	**5.80**
	RETURN TO INVESTMENT	**(A-E+C3)**	7.2 %	**98,580.41**	**8.67**
	RETURN TO EQUITY	**(A-E)**		**65,579.78**	**5.77**

Table 9: Average Investment for Cucumber Producing Greenhouses in Alberta, 2011

Greenhouse Area: 11,572 sq. m.

INVESTMENT SUMMARY:	Total $	$/sq. m.
Land	22,309.38	1.93
Building	856,625.00	74.03
Machinery & Equipment	490,735.00	42.41
TOTAL INVESTMENT	**1,369,669.38**	**118.37**

INVESTMENT DETAIL:	Enterprise Value ($)	Age (Years)	Depreciation ($)
Land - Building Site:	**22,309.38**		
Greenhouse Buildings:	**856,625.00**	**13.80**	**29,981.88**
Equipment:			
Refrigeration / Freezer Storage	985.00	2.1	49.25
Warehouses / Storage Sheds	15,125.00	9.6	756.25
Fuel Tanks	5,062.50	4.4	253.13
Houses (25%)	64,906.25	32.0	3,245.31
Other Buildings	0.00	0.0	0.00
Lighting	225.00	0.8	11.25
Heating System	262,356.25	11.6	13,117.81
Ventilation System	6,956.25	6.0	347.81
Humidity Control	16,075.00	7.0	803.75
Benches	0.00	0.0	0.00
Irrigation System	11,453.75	4.5	1,145.38
Water Pumps / Sand Filters	2,603.13	5.8	260.31
Soil Mixers / Flat Fillers / Seeding Lines	0.00	0.0	0.00
Generators	15,743.75	13.5	1,574.38
Roto-Tillers	238.75	1.8	23.88
Storage / Mixing Tanks	3,131.25	5.8	313.13
Sterilizers	31.25	0.4	3.13
Sprayers	6,976.25	7.1	697.63
Carts / Dolleys	9,316.25	9.6	931.63
Fertilizer Injectors	6,438.13	5.3	643.81
Small Tools / Hardware	14,606.25	8.3	1,460.63
Sub-Total	**442,230.01**		**25,638.47**
Machinery & Vehicles:			
Bobcats / Forklifts	11,197.50	11.30	1,119.75
Trucks	37,307.50	10.50	3,730.75
Other Machinery	0.00	0.00	0.00
Sub-Total	**48,505.00**		**4,850.50**

SECTION V

GREENHOUSE PRODUCTION COSTS AND RETURNS FOR TOMATOES

Greenhouse tomato production has more than doubled during the last decade. The greenhouse area under tomato production was about 150,000 square metres or 15 hectares in 2011. This accounted for about 12 percent of the greenhouse area in Alberta in 2011. The number of greenhouse operations producing tomatoes was reported at 117 in the 2010 survey of the greenhouse industry.

Data on the greenhouse production costs and returns for tomatoes was obtained from seven (7) greenhouse operations across the province. Table 10 shows the production costs and returns for an average tomato producing greenhouse in Alberta in 2011.

Gross Return:
Gross return (A) represents tomato sales and some miscellaneous receipts (wage subsidy, dividend, etc.) during the 2011 crop year. It amounted to $931,790 per average tomato greenhouse with 8,637 square metre production area or $107.88 per square metre.

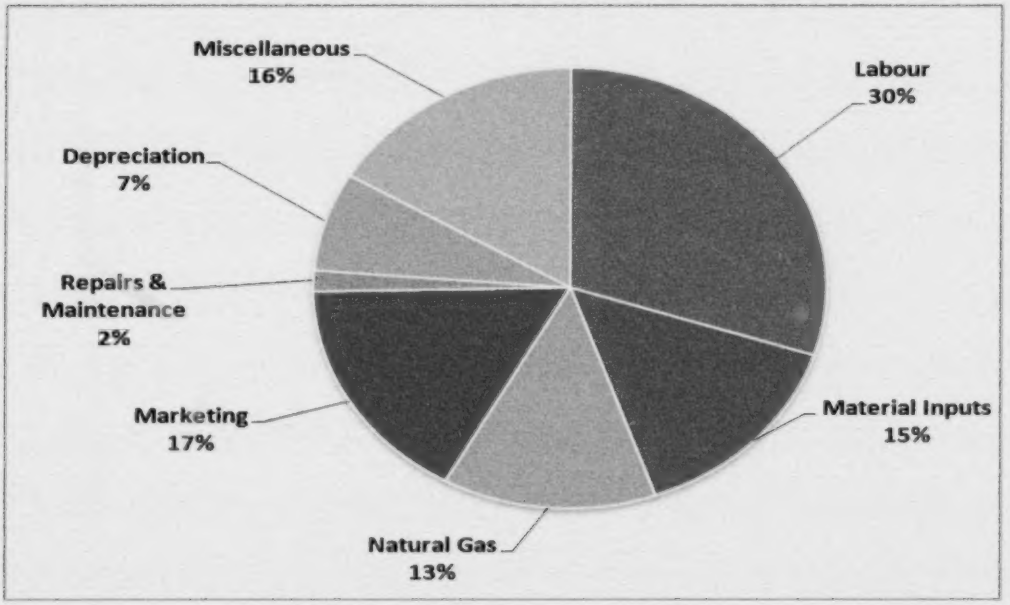
Variable Costs:
Variable costs (B) including unpaid labour amounted to $739,311 per greenhouse or $85.59 per square metre. The most significant cost items for greenhouse tomato production were hired labour costs at $28.18 per square metre followed by marketing costs at $15.79 and natural gas costs at $12.73 per square metre. Detailed breakdown of all variable costs are presented in Table 10.

Capital Costs:
Capital costs (C) were comprised of property/business taxes, equipment and building depreciation, lease payments and actual capital interest paid. The average total capital costs for a tomato-producing greenhouse was $77,322 or $8.95 per square metre. Equipment and building depreciation accounted for about 77 percent of total capital cost.

Cash Costs:
Cash Costs (D) comprise of out-of-pocket costs incurred during the tomato production period. These costs were estimated at $755,713 per average tomato producing greenhouse with a production area of 8,637 square metres. In terms of per square metre, these costs were $87.49.

Total Production Costs:
Average total production costs for tomato producing greenhouses in Alberta were calculated to be $816,632 or $94.54 per square metre for the 2011 crop year. Labour accounted for about 30 percent of total production costs. This was followed by marketing costs at 17 percent and natural gas costs at 13 percent. Details on various costs are presented in Table 10. Figure 6 presents the breakdown of major production costs.

Figure 6: Breakdown of Greenhouse Tomato Production Costs in Alberta, 2011



Management Indicators:
For an average tomato-producing greenhouse in Alberta, gross margin was positive at $176,076 per greenhouse or $20.39 per square metre. Average return to unpaid labour was positive at $116,632 per greenhouse or $13.51 per square metre. Average return to investment was estimated at 10.6 percent. In terms of dollars per greenhouse it was $129,251 or $14.97 per square metre. Average return to equity was positive at $115,157 per tomato-producing greenhouse or $13.74 per square metre. Details on management indicators are presented in Table 10.

Investment Costs:
The investment data was obtained from seven tomato producing greenhouse operations across the province. The average greenhouse area for these operations was 9,043 square metres. Average land area associated with these greenhouses was a little over four acres valued at $23,689 or $2.62 per square metre.

Buildings investment for tomato producing greenhouses was reported at $592,374 or $65.51 per square metre. Machinery and equipment investment for these greenhouses amounted to $606,895 per greenhouse or $67.11 per square metre. A detailed breakdown of land, buildings, machinery and equipment investment are presented in Table 11. Total investment for tomato producing greenhouses was estimated at $1,222,959 or $135.24 per square metre.

Table 10: Production Costs and Returns for Tomato Producing Greenhouses, 2011

Production Area: 8,637 sq. m.

Number of producers: 7

				Total $	$/sq. m.
(A)					
	1. Crop Sales - Imputed Value of Production			931,789.71	107.88
	2. Crop Insurance Receipts			0	0.00
	3. Miscellaneous Receipts			0	0.00
	GROSS RETURN			**931,789.71**	**107.88**
(B)					
	1. Growing Media, Seed/Cuttings			53,490.00	6.19
	2. Fertilizer and Chemicals			57,110.43	6.61
	3. Greenhouse Insurance			12,984.29	1.50
	4. Trays, Boxes and Other Packaging			8,440.71	0.98
	5. Freight and/or Trucking Costs			5,323.29	0.62
	6. Auto Fuel, Repairs, Licenses and Auto Ins.			14,020.71	1.62
	7. Repairs - Buildings and Equipment			12,330.00	1.43
	8. Utilities: Natural Gas	0.00 GJ		109,981.14	12.73
	9. Electricity	0.00 KW		33,118.86	3.83
	10. Water	0.00 M^3		6,086.57	0.70
	11. Phone			1,478.86	0.17
	12. Custom Work and Specialized Labour			1,944.29	0.23
	13. Marketing Costs			136,353.57	15.79
	14. Assoc. Dues, Prof'l Fees and Promotion			9,211.00	1.07
	15. Small Tools, Supplies and Misc. Expenses			8,228.29	0.95
	16. Operating Interest Paid			852.79	0.10
	17. Labour Insurance/Benefits			23,521.57	2.72
	18. Hired Labour	16,575.14 hours		243,360.00	28.18
	19. Unpaid Labour	184.29 hours		1,474.29	0.17
	VARIABLE COSTS			**739,310.66**	**85.59**
(C)					
	1. Property/Business taxes			3,440.43	0.40
	2. Equipment and Building	a) Depreciation		59,444.81	6.88
		b) Lease Payments		342.86	0.04
	3. Paid Capital Interest			14,093.57	1.63
	TOTAL CAPITAL COSTS			**77,321.67**	**8.95**
(D)	**CASH COSTS**	**(B+C-B19-C2a)**		**755,713.23**	**87.49**
(E)	**TOTAL PRODUCTION COSTS**	**(B+C)**		**816,632.33**	**94.54**
(F)	**GROSS MARGIN**	**(A-D)**		**176,076.48**	**20.39**
	RETURN TO UNPAID LABOUR	**(A-E+B19)**		**116,631.67**	**13.51**
	RETURN TO INVESTMENT	**(A-E+C3)**	10.6 %	**129,250.95**	**14.97**
	RETURN TO EQUITY	**(A-E)**		**115,157.38**	**13.34**

Table 11: Average Investment for Tomato Producing Greenhouses in Alberta, 2011

Greenhouse Area: 9,043 sq. m.

INVESTMENT SUMMARY:	**Total $**	**$/sq. m.**
Land	23,689.29	2.62
Building	592,374.29	65.51
Machinery & Equipment	606,895.00	67.11
TOTAL INVESTMENT	**1,222,958.58**	**135.24**

INVESTMENT DETAIL:	**Enterprise Value ($)**	**Age (Years)**	**Depreciation ($)**
Land - Building Site:	**23,689.29**		
Greenhouse Buildings:	**592,374.29**	**10.40**	**20,733.10**
Equipment:			
Refrigeration / Freezer Storage	441.43	2.4	22.07
Warehouses / Storage Sheds	24,607.14	8.00	1,230.36
Fuel Tanks	939.29	6.40	46.96
Houses (25%)	39,589.29	33.60	1,979.46
Other Buildings	0.00	0.00	0.00
Lighting	257.14	0.90	12.86
Heating System	351,707.14	9.00	17,585.36
Ventilation System	321.43	2.00	16.07
Humidity Control	12,407.14	7.60	620.36
Benches	9,285.71	1.70	464.29
Irrigation System	16,348.57	4.60	1,634.86
Water Pumps / Sand Filters	3,932.14	8.10	393.21
Soil Mixers / Flat Fillers / Seeding Lines	0.00	0.00	0.00
Generators	10,071.43	11.10	1,007.14
Roto-Tillers	693.57	3.00	69.36
Storage / Mixing Tanks	13,214.29	9.60	1,321.43
Sterilizers	5,428.57	1.30	542.86
Sprayers	2,107.86	5.00	210.79
Carts / Dolleys	46,064.29	8.70	4,606.43
Fertilizer Injectors	6,763.57	6.70	676.36
Small Tools / Hardware	10,078.57	8.70	1,007.86
Sub-Total	**554,258.57**		**33,448.09**
Machinery & Vehicles:			
Bobcats / Forklifts	11,512.86	9.80	1,151.29
Trucks	41,123.57	10.00	4,112.36
Other Machinery	0.00	0.00	0.00
Sub-Total	**52,636.43**		**5,263.65**

SECTION VI

GREENHOUSE PRODUCTION COSTS AND RETURNS FOR PEPPERS

Greenhouse pepper production in Alberta has increased significantly during the last ten to twelve years. At the start of the nineties there were very few greenhouse operations that produced peppers. The 2003 greenhouse industry survey reported 28 operations producing peppers. A survey of the industry in 2010 reported 69 pepper growers across the province, an increase of 146 percent over 2003. Presently, greenhouse pepper production represents five (5) percent of the total greenhouse area in the province and about 12 percent of the area under vegetables.

Gross Return:
Gross return (A) represents total value of pepper sales during the crop year. Gross return from an average greenhouse producing peppers including miscellaneous receipts was $381,400 or $103.59 per square metre (Table 12). The average size of the greenhouse was 3,682 per square metre. Among the three major greenhouse vegetables (cucumbers, tomatoes and peppers), peppers showed the lowest return per square metre.

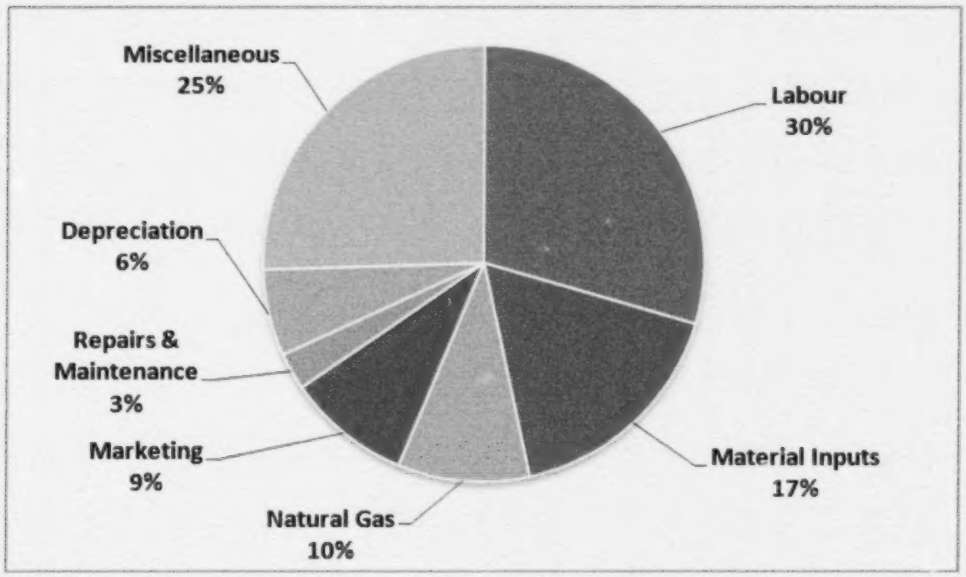
Variable Costs:
Variable costs (B) for greenhouses producing peppers amounted to $357,822 or $97.18 per square metre. Among these costs, hired labour was the highest at $30.98, followed by electricity at $14.12, growing media and seed at $10.96, natural gas at $10.35 and marketing costs at $9.81 per square metre. Meanwhile, other significant costs were fertilizer and chemicals, repairs and small tools, supplies and miscellaneous expenses. A detailed breakdown of these costs is presented in Table 12.

Capital Costs:
Capital costs (C) were made up of property/business taxes, equipment and building depreciation and paid capital interest. Average total capital cost per greenhouse producing peppers amounted to $37,432 or $10.16 per square metre.

Cash Costs:
Cash costs (D) represent all costs incurred during the crop production period less unpaid labour, equipment and building depreciation. These costs were estimated at $367,338 per average greenhouse or $99.76 per square metre for pepper production.

Total Production Costs:
Average total production costs for pepper producing greenhouses amounted to $395,254 or $107.34 per square metre. Details on total production costs are presented in Table 12. Figure 7 shows a breakdown of major production costs for greenhouse pepper production. The most significant cost items were labour at 30 percent, followed by material input costs at 17 percent and natural gas costs at 10 percent.

Figure 7: Breakdown of Greenhouse Pepper Production Costs in Alberta, 2011



Management Indicators:
When cash costs (D) were deducted from gross return (A), average greenhouse producing peppers showed a positive gross margin of $14,062 or $3.82 per square metre. Among the greenhouse producing vegetable crops, peppers showed relatively lower gross margin per square metre. Average returns to unpaid labour, investment and equity were all negative. Details on management indicators are presented in Table 12.

Investment Costs:
Greenhouse investment data was obtained from five (5) pepper producing greenhouse operations in Alberta. Average land area associated with greenhouses producing peppers about two acres. It was valued at $11,420 or $3.10 per square metre. Average greenhouse area for pepper production was reported at 3,682 square metres for the 2011 crop year.

Buildings investment for pepper producing greenhouses was reported at $361,000 per greenhouse or $98.05 per square metre. Machinery and equipment investment for this greenhouse was estimated at $172,505 or $46.85 per square metre. When land, buildings, machinery and equipment investments were combined, total investment for pepper producing greenhouses amounted to $544,925 or $148.00 per square metre of greenhouse area. Details on land, buildings, and machinery and equipment investments are provided in Table 13.

Table 12: Production Costs and Returns for Pepper Producing Greenhouses, 2011

Production Area: 3,682 sq. m.
Number of producers: 5

				Total $	$/sq. m.
(A)					
	1. Crop Sales - Imputed Value of Production			381,400.00	103.59
	2. Crop Insurance Receipts			0	0.00
	3. Miscellaneous Receipts			0	0.00
	GROSS RETURN			**381,400.00**	**103.59**
(B)					
	1. Growing Media, Seed/Cuttings			40,341.80	10.96
	2. Fertilizer and Chemicals			23,571.00	6.40
	3. Greenhouse Insurance			7,746.00	2.10
	4. Trays, Boxes and Other Packaging			3,592.60	0.98
	5. Freight and/or Trucking Costs			5,071.00	1.38
	6. Auto Fuel, Repairs, Licenses and Auto Ins.			5,753.80	1.56
	7. Repairs - Buildings and Equipment			10,856.00	2.95
	8. Utilities: Natural Gas	0.00 GJ		38,107.40	10.35
	9. Electricity	0.00 KW		51,983.60	14.12
	10. Water	0.00 M^3		945.00	0.26
	11. Phone			933.00	0.25
	12. Custom Work and Specialized Labour			1,490.00	0.40
	13. Marketing Costs			36,110.00	9.81
	14. Assoc. Dues, Prof'l Fees and Promotion			2,537.00	0.69
	15. Small Tools, Supplies and Misc. Expenses			9,464.40	2.57
	16. Operating Interest Paid			778.20	0.21
	17. Labour Insurance/Benefits			1,932.00	0.52
	18. Hired Labour	8,554.40 hours		114,073.00	30.98
		317 hours			
	19. Unpaid Labour			2,536.00	0.69
	VARIABLE COSTS			**357,821.80**	**97.18**
(C)					
	1. Property/Business taxes			504.40	0.14
	2. Equipment and Building	a) Depreciation		25,379.70	6.89
		b) Lease Payments		754.20	0.20
	3. Paid Capital Interest			10,794.00	2.93
	TOTAL CAPITAL COSTS			**37,432.30**	**10.16**
(D)	**CASH COSTS**	**(B+C-B19-C2a)**		**367,338.40**	**99.76**
(E)	**TOTAL PRODUCTION COSTS**	**(B+C)**		**395,254.10**	**107.34**
(F)	**GROSS MARGIN**	**(A-D)**		**14,061.60**	**3.82**
	RETURN TO UNPAID LABOUR	**(A-E+B19)**		**-11,318.10**	**-3.07**
	RETURN TO INVESTMENT	**(A-E+C3)**	-0.6 %	**-3,060.10**	**-0.83**
	RETURN TO EQUITY	**(A-E)**		**-13,854.10**	**-3.76**

Table 13: Average Investment for Pepper Producing Greenhouses in Alberta, 2011

Greenhouse Area: 3,682 sq. m.

INVESTMENT SUMMARY:	**Total $**	**$/sq. m.**
Land	11,420.00	3.10
Building	361,000.00	98.05
Machinery & Equipment	172,505.00	46.85
TOTAL INVESTMENT	**544,925.00**	**148.00**

INVESTMENT DETAIL:	**Enterprise Value ($)**	**Age (Years)**	**Depreciation ($)**
Land - Building Site:	**11,420.00**		
Greenhouse Buildings:	**361,000.00**	**9.40**	**12,635.00**
Equipment:			
Refrigeration / Freezer Storage	406	3.4	20.3
Warehouses / Storage Sheds	19,350.00	11.20	967.50
Fuel Tanks	885.00	9.00	44.25
Houses (25%)	9,975.00	40.40	498.75
Other Buildings	0.00	0.00	0.00
Lighting	80.00	1.20	4.00
Heating System	57,260.00	8.00	2,863.00
Ventilation System	100.00	2.80	5.00
Humidity Control	2,060.00	3.80	103.00
Benches	0.00	0.00	0.00
Irrigation System	5,146.00	5.80	514.60
Water Pumps / Sand Filters	2,610.00	8.20	261.00
Soil Mixers / Flat Fillers / Seeding Lines	0.00	0.00	0.00
Generators	3,230.00	9.80	323.00
Roto-Tillers	237.00	4.20	23.70
Storage / Mixing Tanks	15,270.00	8.60	1,527.00
Sterilizers	400.00	1.80	40.00
Sprayers	647.00	6.00	64.70
Carts / Dolleys	19,362.00	9.00	1,936.20
Fertilizer Injectors	2,344.00	6.60	234.40
Small Tools / Hardware	7,630.00	9.00	763.00
Sub-Total	**146,992.00**		**10,193.40**
Machinery & Vehicles:			
Bobcats / Forklifts	6,278.00	10.80	627.80
Trucks	19,235.00	7.90	1,923.50
Other Machinery	0.00	0.00	0.00
Sub-Total	**25,513.00**		**2,551.30**

SECTION VII

GREENHOUSE PRODUCTION COSTS AND RETURNS FOR BEDDING PLANTS/ORNAMENTALS

Greenhouse bedding plants production in Alberta has been increasing steadily over the years despite competition from cheap imports from British Columbia and south of the border. During the 2010 greenhouse industry survey, total area under floriculture which includes cut flowers, potted flowers and ornamentals, bedding and foliage plants was estimated at 428,093 square metres. This translates into about 35 percent of the greenhouse area in Alberta. Total area under greenhouse bedding plants was estimated at 386,843 square metre or 32 percent of the total greenhouse area in the province. The number of greenhouse operations producing bedding plants and ornamentals was reported around 75.

Production costs and returns as well as investment data presented in Tables 14 and 15 were obtained from eight (8) greenhouse operations across the province.

Gross Return:
Gross return (A) represents sales of bedding plants/ornamentals during the 2011 crop production year. For a greenhouse with a production area of 2,076 square metres, gross return including miscellaneous receipts was calculated at $329,000 per average greenhouse or $158.51 per square metre.

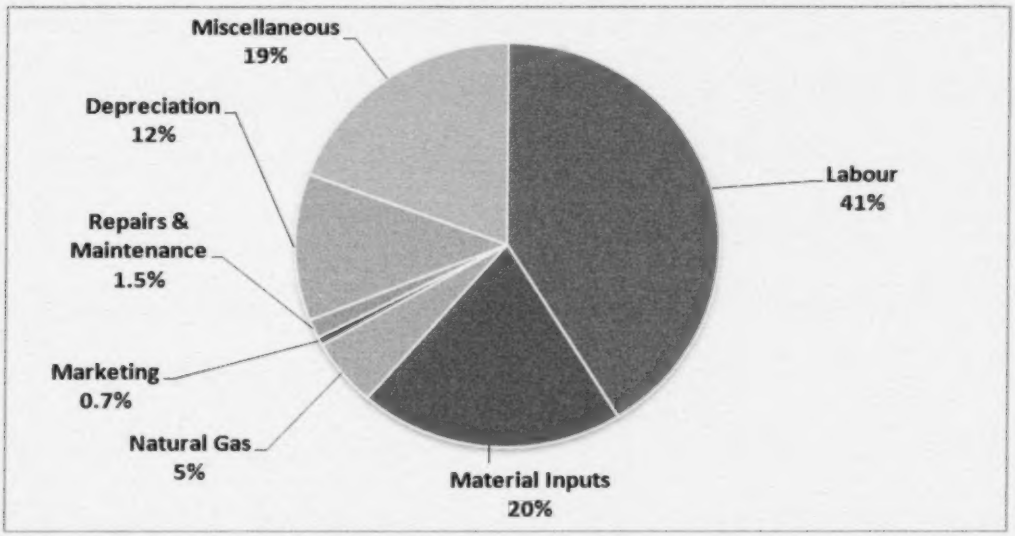
Variable Costs:
Variable costs (B) represent all out-of-pocket costs including unpaid labour. These costs were estimated at $225,013 per average greenhouse of 2,076 square metres or $108.39 per square metre. The most significant cost items were hired labour at $50.40 per square metre, followed by growing media, seed/cuttings at $19.63 per square metre. Details on all variable cost items are presented in Table 14.

Capital Costs:
Capital costs (C) include property/business taxes, equipment and building depreciation and actual interest paid on capital. These costs were estimated at $36,200 per average greenhouse or $17.44 per square metre.

Cash Costs:
Cash costs (D) represent all out-of-pocket costs incurred during 2011 production period. These amounted to $227,501 per greenhouse with an average area of 2,076 per square metres or $109.59 per square metre.

Total Production Costs:
Average total production costs (E) for bedding plants/ornamentals producing greenhouses were calculated at $261,214 or $125.83 per square metre. Detailed breakdowns of various cost items are given in Table 14. Figure 8 shows the relative proportion of all production costs for greenhouse bedding plants/ornamentals.

Figure 8: Breakdown of Greenhouse Bedding Plants/Ornamental Production Costs, 2011



Management Indicators:
Gross margin was calculated at $101,499 for an average greenhouse producing bedding plants/ornamentals. In terms of per square metre, gross margin was $48.92. It was the highest gross margin recorded when compared with other greenhouse crops. Average return to unpaid labour for these greenhouses was $70,693 or $34.08 per square metre for bedding plants/ornamentals produced in 2011. Average return to investment was estimated at approximately 11.4 percent. In terms of total amount it was $71,297 per average greenhouse or $34.38 per square metre. Return to equity amounted to $67,786 per greenhouse or $32.68 per square metre. Details on gross return, production costs and management indicators are presented in Table 14.

Investment Costs:
Average land area associated with greenhouse operations producing bedding plants and ornamentals was approximately 3.5 acres. Total land cost was estimated at $19,018 per average greenhouse area of 2,076 square metres or $9.16 per square metre. Building investment for the above sized greenhouse amounted to $240,000 or $115.63 per square metre. Machinery and equipment investment was estimated at $364,717 per average greenhouse or $175.72 per square metre.

A detailed breakdown of land, buildings, machinery and equipment investment is presented in Table 15. Total investment amounted to $623,734 per average greenhouse operation producing bedding plants and ornamentals. In terms of dollars per square metre investment was estimated at $300.51.

Table 14: Production Costs and Returns for Bedding Plant/Ornamental Greenhouses, 2011

Production Area: 2,076 sq. m.
Number of producers: 8

				Total $	$/sq. m.
(A)					
	1. Crop Sales - Imputed Value of Production			319,666.67	154.01
	2. Crop Insurance Receipts			9,333.33	4.50
	3. Miscellaneous Receipts			0.00	0.00
	GROSS RETURN			**329,000.00**	**158.51**
(B)					
	1. Growing Media, Seed/Cuttings			40,750.00	19.63
	2. Fertilizer and Chemicals			3,466.67	1.67
	3. Greenhouse Insurance			3,833.33	1.85
	4. Trays, Boxes and Other Packaging			8,425.00	4.06
	5. Freight and/or Trucking Costs			4,966.67	2.39
	6. Auto Fuel, Repairs, Licenses and Auto Ins.			5,641.67	2.72
	7. Repairs - Buildings and Equipment			3,933.33	1.89
	8. Utilities: Natural Gas			15,830.50	7.29
	9. Electricity	0.00 GJ		6,304.88	2.90
	10. Water	0.00 KW		853.13	0.39
	11. Phone	0.00 M^3		1,621.67	0.78
	12. Custom Work and Specialized Labour			250.00	0.12
	13. Marketing Costs			1,733.33	0.83
	14. Assoc. Dues, Prof'l Fees and Promotion			11,750.00	5.66
	15. Small Tools, Supplies and Misc. Expenses			3,141.67	1.51
	16. Operating Interest Paid			1,416.67	0.68
	17. Labour Insurance/Benefits			4,933.33	2.38
	18. Hired Labour	9,680.83 hours		104,626.67	50.40
	19. Unpaid Labour	363.33 hours		2,906.67	1.40
	VARIABLE COSTS			**225,013.35**	**108.39**
(C)					
	1. Property/Business taxes			1,883.33	0.91
	2. Equipment and Building	a) Depreciation		30,805.83	14.84
		b) Lease Payments		0.00	0.00
	3. Paid Capital Interest			3,511.00	1.69
	TOTAL CAPITAL COSTS			**36,200.16**	**17.44**
(D)	**CASH COSTS**		(B+C-B19-C2a)	**227,501.01**	**109.59**
(E)	**TOTAL PRODUCTION COSTS**		(B+C)	**261,213.51**	**125.83**
(F)	**GROSS MARGIN**		(A-D)	**101,498.99**	**48.92**
	RETURN TO UNPAID LABOUR		(A-E+B19)	**70,693.16**	**34.08**
	RETURN TO INVESTMENT		(A-E+C3) 11.4 %	**71,297.49**	**34.38**
	RETURN TO EQUITY		(A-E)	**67,786.49**	**32.68**

Table 15: Average Investment for Bedding Plant/Ornamental Greenhouses, 2011

	Greenhouse Area: 2,076 sq. m.		
INVESTMENT SUMMARY:	**Total $**		**$/sq. m.**
Land	19,017.50		9.16
Building	240,000.00		115.63
Machinery & Equipment	364,716.67		175.72
TOTAL INVESTMENT	**623,734.17**		**300.51**
INVESTMENT DETAIL:	**Enterprise Value ($)**	**Age (Years)**	**Depreciation ($)**
Land - Building Site:	**19,017.50**		
Greenhouse Buildings:	**240,000.00**	**13.30**	**8,400.00**
Equipment:			
Refrigeration / Freezer Storage	0.00	0.00	0.00
Warehouses / Storage Sheds	22,900.00	10.30	1,145.00
Fuel Tanks	1,333.33	9.20	66.67
Houses (25%)	110,416.67	19.50	5,520.83
Other Buildings	5,666.67	9.20	283.33
Lighting	333.33	1.30	16.67
Heating System	122,666.67	7.20	6,133.33
Ventilation System	2,500.00	5.20	125.00
Humidity Control	1,666.67	1.20	83.33
Benches	13,833.33	5.70	691.67
Irrigation System	7,833.33	3.50	783.33
Water Pumps / Sand Filters	6,966.67	7.00	696.67
Soil Mixers / Flat Fillers / Seeding Lines	4,166.67	6.20	416.67
Generators	8,000.00	14.80	800.00
Roto-Tillers	1,333.33	2.00	133.33
Storage / Mixing Tanks	3,283.33	4.00	328.33
Sterilizers	33.33	2.50	3.33
Sprayers	1,375.00	6.00	137.50
Carts / Dolleys	4,500.00	9.00	450.00
Fertilizer Injectors	8,400.00	8.80	840.00
Small Tools / Hardware	6041.67	9.8	604.17
Sub-Total	**333,250.00**		**19,259.16**
Machinery & Vehicles:			
Bobcats / Forklifts	8,333.33	5.00	833.33
Trucks	16,216.67	8.90	1,621.67
Other Machinery	6,916.67	0.50	691.67
Sub-Total	**31,466.67**		**3,146.67**

SECTION VIII

GREENHOUSE PRODUCTION COSTS AND RETURNS FOR CUT FLOWERS

Greenhouse area in Alberta under cut flowers is relatively small compared to other major greenhouse crops. In the 2010 greenhouse industry survey, the area for cut flowers was estimated at 41,250 square metre or about three (3) percent of the total greenhouse area in the province. Number of greenhouse operations producing cut flowers was estimated at 21 in 2010.

During the 2011 cost of production survey of the greenhouse industry few cut flower operations provided production costs and returns data. To maintain confidentiality, the results presented in this report are a blend of 2008 and 2011 data.

Specifically, data on greenhouse investment, gross return and production costs obtained in 2008 from cut flower operations in Alberta was updated to 2011 and blended with the actual 2011 data collected. The average size of these cut flowers producing operations was about 2,994 per square metre.

Gross Return:
Cut flower sales for an average greenhouse with production area of 2,994 square metres were estimated at $446,600 or $149.16 per square metre (Table 16). When crop insurance and other miscellaneous receipts were included to value of cut flower sales, total gross return increased to $453,933 per greenhouse or $151.61 per square metre.

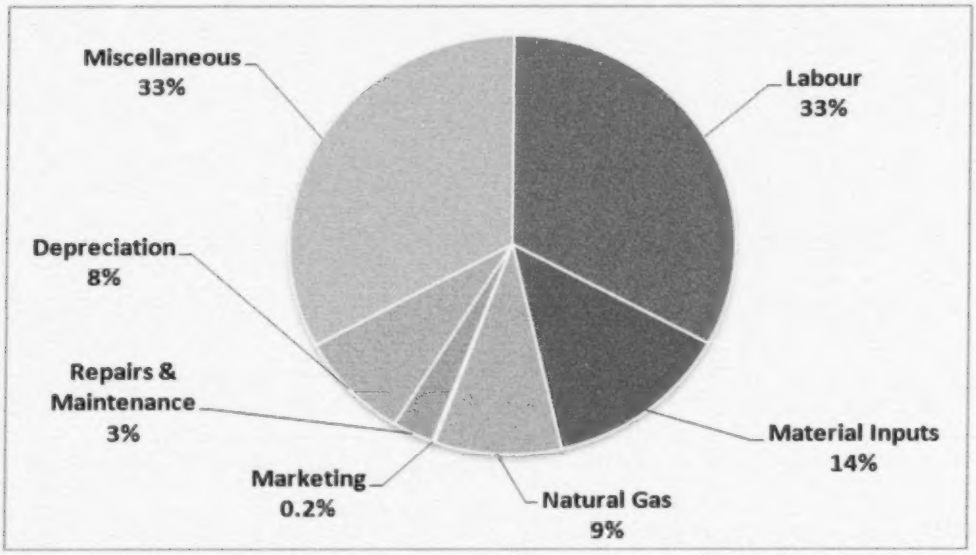
Variable Costs:
Variable costs (B) including unpaid labour amounted to $320,697 per average greenhouse (2,994 square metres) producing cut flowers. In terms of variable costs per square metre, these were $107.11. The most significant cost items were hired labour followed by natural gas costs. The detailed breakdown of all variable cost items is presented in Table 16.

Capital Costs:
Capital costs (C) include cost items such as property/business taxes, equipment and building depreciation, lease payments and capital interest payment. These costs were estimated at $48,440 per average greenhouse producing cut flowers or $16.18 per square metre.

Cash Costs:
Cash Costs (D) for cut flower production were estimated at $313,959 per average greenhouse or $104.86 per square metre.

Total Production Costs:
Total production costs (E), which includes all variable costs (B) and capital costs (C) were calculated to be $369,138 or $123.29 per square metre. Details on production costs are given in Table 16. Figure 9 presents the breakdown of production costs for greenhouse cut flower production.

Figure 9: Breakdown of Greenhouse Cut Flower Production Costs, 2011



Management Indicators:

Gross margin (F) for cut flowers production was $139,975 per greenhouse or $46.75 per square metre. Average return to unpaid labour was estimated at $109,356 per greenhouse or $36.52 per square metre. Return to investment for cut flower production was calculated at 14.3 percent. It was $87,517 per greenhouse and $29.23 per square metre. Return to equity was estimated at $84,796 per greenhouse ($28.32 per square metre). The details on management indicators are presented in Table 16.

Investment Costs:

Land area associated with an average cut flower producing greenhouse was about two acres. Land was valued at $12,833 or $4.14 per square metre. Building investment for cut flower greenhouses was estimated at $208,433 or $67.28 per square metre. Machinery and equipment represented almost 64 percent of the total investment, which amounted to $391,355 or $126.33 per square metre. Total value of investment for a 3,098 square metre greenhouse producing cut flowers was about $612,622 or $197.75 per square metre. Details on investments for cut flower greenhouses are presented in Table 17.

Table 16: Production Costs and Returns for Cut Flower Producing Greenhouses, 2011

Production Area: 2,994 sq. m.
Number of producers: 3

				Total $	$/sq. m.
(A)					
	1. Crop Sales - Imputed Value of Production			446,600.00	149.16
	2. Crop Insurance Receipts			0	0.00
	3. Miscellaneous Receipts			7,333.33	2.45
	GROSS RETURN			**453,933.33**	**151.61**
(B)					
	1. Growing Media, Seed/Cuttings			28,884.00	9.65
	2. Fertilizer and Chemicals			11,867.33	3.96
	3. Greenhouse Insurance			7,106.00	2.37
	4. Trays, Boxes and Other Packaging			9,014.33	3.01
	5. Freight and/or Trucking Costs			23,245.00	7.76
	6. Auto Fuel, Repairs, Licenses and Auto Ins.			12,500.00	4.18
	7. Repairs - Buildings and Equipment			11,159.00	3.73
	8. Utilities: Natural Gas	0.00 GJ		33,997.33	11.36
	9. Electricity	0.00 KW		33,836.67	11.30
	10. Water	0.00 M^3		123.33	0.04
	11. Phone			4,025.67	1.34
	12. Custom Work and Specialized Labour			254.33	0.08
	13. Marketing Costs			700.00	0.23
	14. Assoc. Dues, Prof'l Fees and Promotion			13,072.33	4.37
	15. Small Tools, Supplies and Misc. Expenses			5,713.33	1.91
	16. Operating Interest Paid			500.00	0.17
	17. Labour Insurance/Benefits			3,512.00	1.17
	18. Hired Labour	8,196.00 hours		96,626.67	32.27
	19. Unpaid Labour	3,070.00 hours		24,560.00	8.20
	VARIABLE COSTS			**320,697.32**	**107.11**
(C)					
	1. Property/Business taxes			15,100.00	5.04
	2. Equipment and Building	a) Depreciation		30,619.00	10.23
		b) Lease Payments		0.00	0.00
	3. Paid Capital Interest			2,721.33	0.91
	TOTAL CAPITAL COSTS			**48,440.33**	**16.18**
(D)	**CASH COSTS**	**(B+C-B19-C2a)**		**313,958.65**	**104.86**
(E)	**TOTAL PRODUCTION COSTS**	**(B+C)**		**369,137.65**	**123.29**
(F)	**GROSS MARGIN**	**(A-D)**		**139,974.68**	**46.75**
	RETURN TO UNPAID LABOUR	**(A-E+B19)**		**109,355.68**	**36.52**
	RETURN TO INVESTMENT	**(A-E+C3)**	14.3 %	**87,517.01**	**29.23**
	RETURN TO EQUITY	**(A-E)**		**84,795.68**	**28.32**

Table 17: Average Investment for Cut Flower Producing Greenhouses, 2011

Greenhouse Area: 3,098 sq. m.

INVESTMENT SUMMARY:	**Total $**	**$/sq. m.**
Land	12,833.33	4.14
Building	208,433.33	67.28
Machinery & Equipment	391,355.00	126.33
TOTAL INVESTMENT	**612,621.66**	**197.75**

INVESTMENT DETAIL:	**Enterprise Value ($)**	**Age (Years)**	**Depreciation ($)**
Land - Building Site:	**12,833.33**		
Greenhouse Buildings:	**208,433.33**	**18.70**	**7,295.17**
Equipment:			
Refrigeration / Freezer Storage	15,200.00	16.30	760.00
Warehouses / Storage Sheds	59,100.00	9.70	2,955.00
Fuel Tanks	1,500.00	15.30	75.00
Houses (25%)	80,700.00	23.70	4,035.00
Other Buildings	0.00	0.00	0.00
Lighting	4,766.67	8.70	238.33
Heating System	134,900.00	15.00	6,745.00
Ventilation System	0.00	0.00	0.00
Humidity Control	10,500.00	14.30	525.00
Benches	9,566.67	10.00	478.33
Irrigation System	10,866.67	10.00	1,086.67
Water Pumps / Sand Filters	4,166.67	11.70	416.67
Soil Mixers / Flat Fillers / Seeding Lines	2,333.33	3.30	233.33
Generators	7,233.33	22.00	723.33
Roto-Tillers	1,733.33	17.00	173.33
Storage / Mixing Tanks	5,966.67	12.70	596.67
Sterilizers	0.00	0.00	0.00
Sprayers	821.67	18.70	82.17
Carts / Dolleys	633.33	11.70	63.33
Fertilizer Injectors	3,300.00	11.70	330.00
Small Tools / Hardware	5,066.67	14.50	506.67
Sub-Total	**358,355.01**		**20,023.83**
Machinery & Vehicles:			
Bobcats / Forklifts	10,300.00	11.70	1,030.00
Trucks	22,700.00	13.30	2,270.00
Other Machinery	0.00	0.00	0.00
Sub-Total	**33,000.00**		**3,300.00**

SECTION IX

GREENHOUSE PRODUCTION COSTS AND RETURNS FOR TREE SEEDLINGS

Greenhouse tree seedling production in Alberta received a big boost in the late eighties when a decision was made to encourage local production of seedlings. Prior to this, forestry tree seedlings were largely imported from British Columbia. As soon as the contracts to grow seedlings locally became available, several existing greenhouses switched to producing seedlings. At the same time quite a few new greenhouses were also built to meet the contractual demand.

In 2010, the survey of the greenhouse industry showed that tree seedlings constitute about 165,058 square metres (16.5 hectares or 40.8 acres) of greenhouse area in the province. In total, there were 26 greenhouse operations engaged in tree seedling production in 2010. Average area per tree seedling producing greenhouse was estimated at 6,347 square metres in 2010. Presently, tree seedlings constitute approximately 41 acres of greenhouse area in Alberta and are the third largest greenhouse crop after bedding plants and cucumbers.

During the 2011 costs of production survey, few tree seedlings operations provided production costs and returns data. To maintain confidentiality, the results presented in this report are a blend of 2008 and 2011 data.

Specifically, data on greenhouse investment, gross return and production costs obtained in 2008 from tree seedlings operations in Alberta was updated to 2011 and blended with the actual 2011 data collected. The average size of these operations was about 10,569 square metres. It is worth noting that greenhouse tree seedlings are produced under contract by forestry companies and the provincial government.

Gross Return:
Gross return (A) represents sales of tree seedlings to the contractors at the agreed price and any income received under crop insurance, etc. Total gross return for average greenhouse (10,569 square metres) producing tree seedlings was estimated at about $1,074,349 or $101.65 per square metre. Details on gross return from sale of tree seedlings are presented in Table 18.

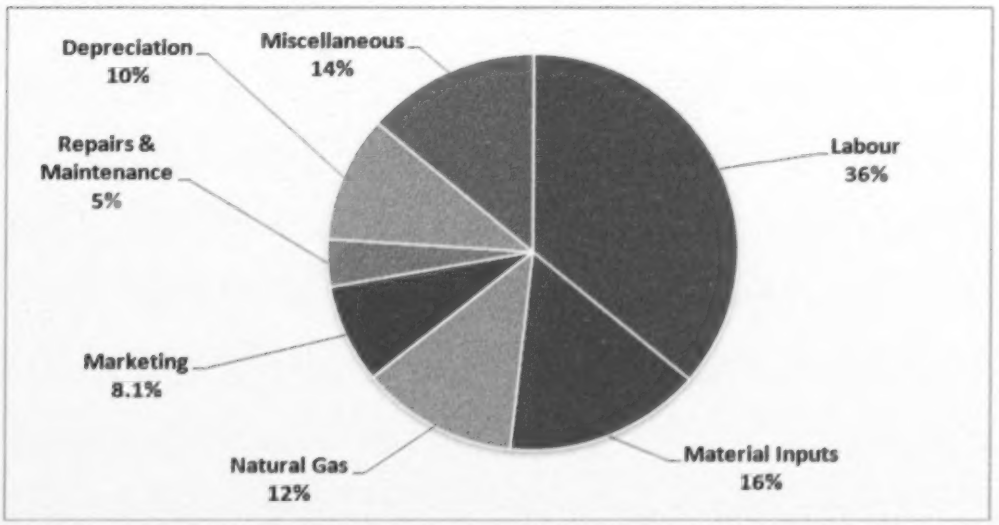
Variable Costs:
Variable costs (B) amounted to $912,595 per average greenhouse producing tree seedlings. In terms of per square metre, these costs were estimated at $86.35. The most significant cost item was hired labour at $31.28 per square metre, about 36 percent of all variable costs. Other significant costs were natural gas, followed by trays, boxes and other packaging, and marketing. A detailed breakdown of all variable costs is presented in Table 18.

Capital Costs:
Capital costs (C) were estimated at $106,320 per average greenhouse producing tree seedlings or $10.06 per square metre. Almost 98 percent of the capital costs were equipment and building depreciation.

Cash Costs:
Cash costs (D) consist of all out-of-pocket costs incurred during the tree seedlings production period. Cash costs were estimated at $877,131 per greenhouse or $82.99 per square metre. These costs were very close to the variable costs.

Total Production Costs:
Average total production costs for tree seedling greenhouses were estimated at $1,018,915 or $96.41 per square metre of greenhouse production area in 2011. The most significant cost items were labour, followed by material inputs, depreciation and natural gas. Details on various costs are presented in Table 18. Figure 10 presents the breakdown of all production costs for greenhouse tree seedling production.

Figure 10: Breakdown of Greenhouse Tree Seedlings Production Costs, 2011



Management Indicators:
For an average tree seedling producing greenhouse, gross margin was calculated at $197,218 or $18.66 per square metre. Average return to unpaid labour was positive at $92,904 per greenhouse producing tree seedlings. It was $8.79 per square metre. Return to investment was calculated at $56,034 per average greenhouse or $5.30 per square metre. In terms of percentage return to investment it was calculated at 2.8 percent. Return to equity was also positive at $55,434 per greenhouse or $5.24 per square metre. Details on management indicators are presented in Table 18.

Investment Costs:
The average greenhouse area for the five (5) tree seedling operations was estimated at 11,323 square metres, which was significantly higher than the industry average of 6,348 square metres reported in 2010. Land area associated with these greenhouses averaged 7.4 acres and it was valued at $40,700 per greenhouse or $3.59 per square metre.

Investment in the greenhouse buildings for tree seedling operations was calculated at $700,760 per operation or $61.89 per square metre. Average investment in machinery and equipment including vehicles amounted to $1,291,505 per greenhouse or $114.06 per square metre. When land, buildings, machinery and equipment investments were combined, total investment was estimated at about $2 million per operation. In terms of dollars per square metre it was $179.54. Details on land, buildings, machinery and equipment investment and depreciation amounts are presented in Table 19.

Table 18: Production Costs and Returns for Tree Seedling Producing Greenhouses, 2011

Production Area: 10,569 sq. m.
Number of producers: 5

				Total $	$/sq. m.
(A)					
	1. Crop Sales - Imputed Value of Production			1,074,348.60	101.65
	2. Crop Insurance Receipts			0	0.00
	3. Miscellaneous Receipts			0.00	0.00
	GROSS RETURN			**1,074,348.60**	**101.65**
(B)					
	1. Growing Media, Seed/Cuttings			43,464.00	4.11
	2. Fertilizer and Chemicals			18,587.40	1.76
	3. Greenhouse Insurance			21,030.00	1.99
	4. Trays, Boxes and Other Packaging			96,490.00	9.13
	5. Freight and/or Trucking Costs			5,646.00	0.53
	6. Auto Fuel, Repairs, Licenses and Auto Ins.			8,080.00	0.76
	7. Repairs - Buildings and Equipment			39,680.00	3.75
	8. Utilities: Natural Gas		0.00 GJ	126,480.00	11.97
	9. Electricity		0.00 KW	49,204.00	4.66
	10. Water		0.00 M^3	3,706.00	0.35
	11. Phone			4,244.00	0.40
	12. Custom Work and Specialized Labour			3,542.00	0.34
	13. Marketing Costs			82,100.00	7.77
	14. Assoc. Dues, Prof'l Fees and Promotion			11,910.00	1.13
	15. Small Tools, Supplies and Misc. Expenses			5,080.00	0.48
	16. Operating Interest Paid			9,400.00	0.89
	17. Labour Insurance/Benefits			15,900.00	1.50
	18. Hired Labour		25,925.40 hours	330,581.27	31.28
	19. Unpaid Labour		3,690.00 hours	37,470.00	3.55
	VARIABLE COSTS			**912,594.67**	**86.35**
(C)					
	1. Property/Business taxes			1,406.00	0.13
	2. Equipment and Building		a) Depreciation	104,314.05	9.87
			b) Lease Payments	0.00	0.00
	3. Paid Capital Interest			600.00	0.06
	TOTAL CAPITAL COSTS			**106,320.05**	**10.06**
(D)	**CASH COSTS**	**(B+C-B19-C2a)**		**877,130.67**	**82.99**
(E)	**TOTAL PRODUCTION COSTS**	**(B+C)**		**1,018,914.72**	**96.41**
(F)	**GROSS MARGIN**	**(A-D)**		**197,217.93**	**18.66**
	RETURN TO UNPAID LABOUR	**(A-E+B19)**		**92,903.88**	**8.79**
	RETURN TO INVESTMENT	**(A-E+C3)**	2.8 %	**56,033.88**	**5.30**
	RETURN TO EQUITY	**(A-E)**		**55,433.88**	**5.24**

Table 19: Average Investment for Tree Seedling Producing Greenhouses, 2011

Greenhouse Area: 11,323 sq. m.			
INVESTMENT SUMMARY:	**Total $**		**$/sq. m.**
Land	40,700.00		3.59
Building	700,760.00		61.89
Machinery & Equipment	1,291,505.00		114.06
TOTAL INVESTMENT	**2,032,965.00**		**179.54**
INVESTMENT DETAIL:	**Enterprise Value ($)**	**Age (Years)**	**Depreciation ($)**
Land - Building Site:	**40,700.00**		
Greenhouse Buildings:	**700,760.00**	**16.80**	**24,526.60**
Equipment:			
Refrigeration / Freezer Storage	29,640.00	7.00	1,482.00
Warehouses / Storage Sheds	216,400.00	16.80	10,820.00
Fuel Tanks	1,036.00	8.40	51.80
Houses (25%)	54,505.00	25.60	2,725.25
Other Buildings	0.00	0.00	0.00
Lighting	92,400.00	11.00	4,620.00
Heating System	372,840.00	14.80	18,642.00
Ventilation System	62,620.00	12.80	3,131.00
Humidity Control	50,940.00	10.40	2,547.00
Benches	106,880.00	15.00	5,344.00
Irrigation System	72,120.00	13.40	7,212.00
Water Pumps / Sand Filters	5,840.00	16.80	584.00
Soil Mixers / Flat Fillers / Seeding Lines	67,940.00	18.00	6,794.00
Generators	23,600.00	20.20	2,360.00
Roto-Tillers	0.00	0.00	0.00
Storage / Mixing Tanks	20,720.00	16.80	2,072.00
Sterilizers	7,260.00	4.20	726.00
Sprayers	2,230.00	12.20	223.00
Carts / Dolleys	18,654.00	16.00	1,865.40
Fertilizer Injectors	9,380.00	16.40	938.00
Small Tools / Hardware	10,700.00	15.60	1,070.00
Sub-Total	**1,225,705.00**		**73,207.45**
Machinery & Vehicles:			
Bobcats / Forklifts	16,260.00	15.80	1,626.00
Trucks	49,540.00	13.30	4,954.00
Other Machinery	0.00	0.00	0.00
Sub-Total	**65,800.00**		**6,580.00**

SECTION X

SUMMARY OF GREENHOUSE PRODUCTION COSTS AND RETURNS

This section provides a summary of 2011 costs and returns data for the various greenhouse crops produced across the province. Data on the major greenhouse crops presented in the various sections above are based on thirty six (36) greenhouse operations in Alberta. Distribution of the study sample by crops is as follows:

Greenhouse Crop	Number of Participants
Cucumber	8*
Tomatoes	7
Peppers	5
Bedding Plants/Ornamentals	8
Cut Flower	3
Tree Seedlings	5
Total	**36**
* Nine (9) greenhouse cucumber producing operations were surveyed in 2011 but the costs and returns information are based on eight (8) operations.	

Investment costs were computed from the data provided by study participants by crops. Total investment per greenhouse and cost per square metre are presented in Table 20 by various crops. Average investment cost per square metre ranged from $118.37 for cucumber to $300.51 for bedding plants/ornamental producing greenhouses in Alberta.

As shown in Table 20, Bedding Plants/Ornamentals production recorded the highest gross return per square metre among the various crops. This was followed by cut flowers, tomatoes, cucumbers, pepper and tree seedlings.

Average production costs for the 2011 crop year, summarized by types of crops produced in greenhouses in Alberta, are presented in Table 20. Production costs varied by type of crops produced in the greenhouses. The major cost items were labour (hired and operator), material inputs, marketing and natural gas. Total production costs ranged from a low of $94.54 per square metre for tomatoes to $125.83 per square metre for bedding plants/ornamentals.

Gross margins estimated were positive for all crops. Greenhouses producing bedding plants/ornamentals showed the highest gross margin per square metre at $48.92 followed by cut flowers at $46.75. Greenhouse pepper production showed the least gross margin at $3.82 per square metre. Average returns to unpaid labour, investment and equity were positive for all crops except peppers. Details on costs and returns are presented in Table 20.

Based on the results of the 2011 study, the gross revenue generated by the provincial greenhouse industry in 2012 was estimated to be about $162 million, with an investment or total value of assets of about $261 million.

It is important to note that the estimated gross revenue was calculated using 2011 average revenue data (total production area, number of units sold and average selling price per unit

sold) collected from thirty six (36) greenhouse operators across the province and acreage information for 2012. The estimated gross revenue does not include the value for the six acres of production under lettuce and other crops for which cost of production numbers are not available. The estimated gross revenue represents sales through the co-ops where applicable and other market outlets.

Table 20: Summary of Greenhouse Production Costs and Returns by Crops, 2011

	Cucumbers	Tomatoes	Pepper	Bedding Plants / Ornamentals	Cut Flowers	Tree Seedlings
	Alberta	Alberta	Alberta	Alberta	Alberta	Alberta
Number of Producers Surveyed	8	7	5	8	3	5
Average Production Area (sq. m.)	11,374	8,637	3,682	2,076	2,994	10,569
..... dollars per square metre						
Average Investment	118.37	135.24	148.00	300.51	197.75	179.54
Gross Return	**107.21**	**107.88**	**103.59**	**158.51**	**151.61**	**101.65**
Material Inputs*	17.63	13.78	18.33	25.36	16.62	15.00
Natural Gas	10.84	12.73	10.35	6.82	11.36	11.97
Hired Labour	26.33	28.18	30.98	50.40	32.27	31.28
Marketing Costs	13.32	15.79	9.81	0.83	0.23	7.77
Other Cash Costs	24.26	14.94	27.02	23.58	38.43	16.79
Operator Labour	0.03	0.17	0.69	1.40	8.20	3.55
Capital Costs	9.03	8.95	10.16	17.44	16.18	10.06
Total Production Costs	**101.44**	**94.54**	**107.34**	**125.83**	**123.29**	**96.41**
Gross Margin	11.12	20.39	3.82	48.92	46.75	18.66
Return to Unpaid labour	5.80	13.51	-3.07	34.08	36.52	8.79
Return to Investment	8.67	14.97	-0.83	34.38	29.23	5.30
Return to Equity	5.77	13.34	-3.76	32.68	28.32	5.24

* Expenses associated with material inputs include (growing media, seed/cuttings, fertilizer and chemicals, trays, boxes and other packaging materials).

APPENDICES

Appendix 1: Summary of Greenhouse Production Costs and Returns by Crops, 2010

	Cucumbers		Tomatoes		Peppers	Bedding Plants/ Ornamentals	Cut Flowers	Tree Seedlings
	Med. Hat/ Redcliff	North-Central	Med. Hat/ Redcliff	North-Central	Med.Hat/ Redcliff	Alberta	Alberta	Alberta
Number Survey	9	3	3	3	5	5	3	7
Average Production Area (sq. meter)	8,540	3,824	12,670	10,717	9,907	2,844	2,994	10,779
----------dollars per square metre----------								
Average Investment	129.68	168.95	116.42	110.48	142.03	130.13	160.40	146.73
Gross Return	**84.98**	**124.29**	**108.45**	**106.95**	**94.13**	**129.89**	**150.33**	**98.16**
Material Inputs	10.81	12.92	9.23	10.39	10.75	21.38	32.29	12.85
Natural Gas	9.02	7.50	12.07	8.72	10.99	4.36	12.46	8.02
Hired Labour	19.88	30.91	27.92	28.86	20.94	26.92	34.72	29.94
Marketing Costs	16.90	17.37	23.85	18.29	12.85	0.35	0.49	6.57
Other Cash Costs	9.58	32.01	10.59	11.70	10.50	17.74	35.79	17.94
Operator Labour	0.00	0.76	1.18	0.00	0.00	5.95	8.74	2.19
Capital Costs	9.66	13.69	11.47	10.22	10.60	10.67	17.25	13.09
Total Production Costs	**75.84**	**115.15**	**96.31**	**88.19**	**76.63**	**87.37**	**141.74**	**90.59**
Gross Margin	15.77	19.53	21.45	26.03	26.42	55.35	28.84	20.67
Return to Investment	15.77	18.77	20.27	26.03	26.42	49.40	20.10	18.47
Return to Equity	9.14	9.14	12.14	18.76	17.50	42.52	8.59	7.57

Appendix 2: Summary of Greenhouse Production Costs and Returns by Crops, 2008

	Cucumbers		Tomatoes		Peppers	Bedding Plants/ Ornamentals	Cut Flowers	Tree Seedlings*
	Med. Hat/ Redcliff	North-Central	Med. Hat/ Redcliff	North-Central	Med.Hat/ Redcliff	Alberta	Alberta	Alberta
Number Survey	9	3	3	3	5	5	3	7
Average Production Area (sq. meter)	8 540	3 824	12 670	10 717	9 907	2 844	2 994	10 779
----------dollars per square metre----------								
Average Investment	140.62	189.89	130.75	125.67	127.50	139.31	172.00	195.50
Gross Return	**82.24**	**126.79**	**109.06**	**103.96**	**102.62**	**129.89**	**170.37**	**93.49**
Material Inputs	12.27	13.78	11.53	12.55	11.14	21.58	17.21	10.59
Natural Gas	15.26	7.05	20.43	14.76	18.71	7.38	12.91	9.94
Hired Labour	18.39	28.88	25.82	26.69	17.17	24.90	30.49	23.17
Marketing Costs	16.89	17.03	23.83	18.28	13.37	0.35	0.54	4.38
Other Cash Costs	10.09	32.64	11.22	12.43	9.13	18.64	58.76	19.41
Operator Labour	0.00	0.71	1.09	0.00	0.00	5.50	4.59	2.08
Capital Costs	11.20	13.43	12.90	11.40	12.13	10.68	10.62	13.09
Total Production Costs	**84.11**	**113.52**	**106.81**	**96.11**	**81.65**	**89.03**	**135.12**	**82.66**
Gross Margin	4.76	23.61	11.47	15.12	29.75	53.24	49.75	23.82
Return to Investment	4.76	22.90	10.38	15.12	29.75	47.74	45.16	21.74
Return to Equity	(1.87)	13.27	2.25	7.85	20.97	40.86	35.25	10.84
*carried forward from the 2005 survey.								

Appendix 3: Summary of Greenhouse Production Costs and Returns by Crops, 2005

SUMMARY OF GREENHOUSE PRODUCTION COSTS AND RETURNS BY CROPS, 2005								
	Cucumbers		**Tomatoes**		**Peppers**	**Bedding Plants/ Ornamentals**	**Cut Flowers**	**Tree Seedlings**
	Med. Hat/ Redcliff	North-Central	Med. Hat/ Redcliff	North-Central	Med.Hat/ Redcliff	Alberta	Alberta	Alberta
Number Survey	6	4	6	5	4	6	3	7
Average Production Area (sq. meter)	6,753	4,480	5,603	4,262	7,305	1,671	2,994	10,779
----------dollars per square metre----------								
Average Investment	100.42	170.74	139.80	178.94	201.07	174.57	214.40	195.50
Gross Return	**88.21**	**90.72**	**90.80**	**97.84**	**94.30**	**135.39**	**143.31**	**93.49**
Material Inputs	14.95	11.98	11.24	11.47	11.74	27.04	25.52	10.59
Natural Gas	16.07	18.31	15.89	18.71	19.57	13.94	15.44	9.94
Hired Labour	16.59	20.10	21.80	24.98	18.09	28.19	26.87	23.17
Marketing Costs	15.24	15.26	19.56	11.76	14.41	1.68	0.33	4.38
Other Cash Costs	11.98	20.04	15.57	13.49	13.48	24.31	33.20	19.41
Operator Labour	0.77	1.90	0.15	1.24	2.22	8.34	8.29	2.08
Capital Costs	10.94	13.68	10.68	17.62	16.01	13.66	17.10	13.09
Total Production Costs	**86.54**	**101.47**	**94.89**	**99.27**	**95.52**	**117.16**	**126.75**	**82.66**
Gross Margin	7.20	0.38	3.21	9.24	11.05	36.61	36.36	23.82
Return to Investment	6.43	(1.52)	3.06	8.00	8.83	28.26	28.07	21.74
Return to Equity	1.67	(10.75)	(4.09)	(1.43)	(1.23)	18.23	16.56	10.84

Appendix 4: Summary of Greenhouse Production Costs and Returns by Crops, 2000

	Cucumbers	Tomatoes	Peppers	Bedding Plants/ Ornamentals	Cut Flowers	Tree Seedlings
Number Survey	10	7	5	7	6	7
Average Production Area, (square metre)	4,958	3,272	3,435	2,443	2,176	10,396
----------dollars per square metre----------						
Average Investment	135.15	152.25	156.67	112.66	205.20	165.70
Gross Revenue	**64.67**	**82.85**	**93.07**	**84.90**	**136.54**	**83.17**
Material Inputs	9.15	11.84	12.48	14.96	31.63	10.33
Natural Gas	10.44	17.22	11.73	7.42	11.62	8.82
Hired Labour	8.72	14.20	9.90	13.67	26.68	33.14
Marketing Costs	10.65	11.51	11.62	2.80	2.69	4.30
Other Cash Costs	11.51	12.37	10.01	8.29	31.10	13.77
Operator Labour	4.95	3.66	6.67	16.46	5.38	1.29
Capital Costs	13.56	15.38	15.60	9.58	13.34	10.76
Total Production Costs	**68.97**	**86.19**	**78.01**	**73.17**	**122.45**	**82.42**
Gross Margin	7.32	8.07	30.56	34.65	30.99	11.51
Return to Investment	2.37	4.41	23.89	18.08	25.61	10.22
Return to Equity	(4.41)	(3.34)	15.16	11.62	14.20	0.75